

Interrelationship in European species of *Ensis*

by

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The genus *Ensis*, which is represented in Europe by 7 species, or 6 if *E. magnus* is united with *E. arcuatus*, is not an easy one from a systematist's point of view. Though the species can be recognized in most cases after a short examination only or even at a glance, it is also true that, at least in certain stages, every species may be confused with 2 or 3 of its nearest allies.

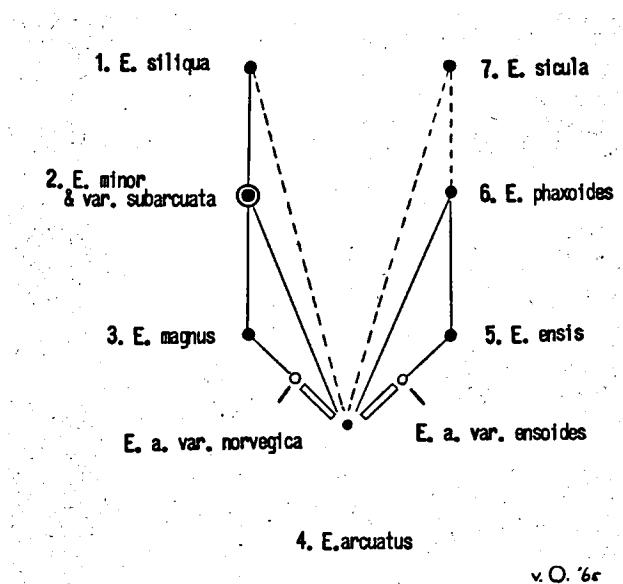


Fig. 1. For explanation see text.

When trying to put these multilateral relations into a diagram in order to make them more clear, I was surprised to get the result shown in Fig. 1. The arrangement of the species in this figure be-

ginning from top left is the same as that in "The genus *Ensis* in Europe" (Basteria Vol. 28, 1964, pp. 13-44), with the exception only of the *Ensis arcuatus* varieties. This arrangement is not an arbitrary one, since it is roughly based upon the shape, the curvature and the dimensions of the shell. Thus it begins with the two large, straight species resembling a *Solen* and ends with the small, curved species reminding one of a *Phaxas*. Between them are placed the representatives of the *E. magnus-arcuatus* group, which may be straight as well as curved, while their dimensions gradually diminish from *E. magnus* to *E. arcuatus* var. *ensooides*.

The central position in the diagram is occupied by *E. arcuatus*, the most variable species of the group. Dots indicate species, open rings varieties, a ring with a dot the combination of the two. Lines connect species and varieties that may be confused: double lines for varieties, single lines for species, and broken lines for cases in which confusion is much less likely, though it may occur.

It will be seen that every species or variety may be confused with its closest neighbours in the diagram, and also with one of the representatives of the central, variable *E. magnus-arcuatus* group! Fortunately such confusion only arises in certain stages or special cases, which will be briefly summarized below.

1. *E. siliqua* (L.) is closely related to *E. minor*, with which it forms a species pair. A few specimens from S.W. Europe have left me in doubt for a long time as to their true identity. I have lately found, however, that such material can be quite satisfactorily classified in the following way:

E. siliqua: posterior aperture oval in outline, about as wide as the anterior aperture; shell of uniform width throughout in ventral view.

E. minor: posterior aperture compressed in outline (the posterior margins of the valves about parallel or even somewhat concave when seen from behind), much narrower than the anterior aperture; shell narrowing posteriorly in ventral view.

In the same way young *E. siliqua* of some 10 cm length can be distinguished from young *E. arcuatus* of similar dimensions, since, with respect to the above mentioned characters, there seems to be no difference between *E. arcuatus* and *E. minor*. Another very useful character distinguishing young *E. siliqua* from young *E. arcuatus* may be found in the posterior margin of the shell, which is obliquely truncated in the former species whereas it is squarely truncated in the latter.

Of course other available characters should always be consulted.

2. *E. minor* (Chenu) is closely related to *E. siliqua* and apparently also to *E. arcuatus*. The var. *subarcuata* is almost intermediate and in a few cases I could not decide between *E. minor* var. *subarcuata* or *E. arcuatus* (s. l.). It is even possible that these critical samples are mixed with *E. phaxoides* which, when fully developed, may show more resemblance to posteriorly tapering *E. arcuatus* than to its nearest ally *E. ensis*.

3. *E. magnus* Schum. is very closely related to *E. arcuatus* var. *norvegica*. Though it may be separated from *E. arcuatus* s.l. as a distinct species, there seem to be equally good arguments for uniting the two into one variable species. The only young specimen I have seen has very much the appearance of *E. minor* var. *subarcuata*, but there are differences in the arrangement of the muscle scars.

4. *E. arcuatus* (Jeffr.) is very closely related to *E. magnus* by way of its var. *norvegica*, whereas the var. *ensoides* approaches *E. ensis* in general appearance and characters. Though young, slender specimens of var. *ensoides* may superficially be very similar to full-grown *E. ensis* in general appearance, there are only very few cases in which the identification presents serious difficulties.

Apart from this *E. arcuatus* is so variable a species, that it may resemble any other species in one or another stage. This is further dealt with under the respective species.

5. *E. ensis* (L.) may resemble young *E. arcuatus* var. *ensoides*, see No. 4, but is more likely to be confused with *E. phaxoides*, see No. 6.

6. *E. phaxoides* Van Urk. The chief systematic problem when dealing with this species is its delimitation from *E. ensis*. Difficulties may especially arise in part of the young material. The more *E. phaxoides* approaches its full dimensions, the more it shows divergence from *E. ensis*, so that in the end it may even approach in general appearance and characters a posteriorly tapering *E. arcuatus*.

7. *E. sicula* Van Urk. Actually the few known specimens do not allow of any serious conclusions as to its affinities, but only this one place in the diagram was open! It may be confused with some *E. arcuatus* forms, while one or two characters remind of *E. phaxoides*.

The diagram should not be considered as showing phylogenetic relationships. Nevertheless it seems interesting that the mutual resemblances in European *Ensis* can be expressed in a characteristic and almost completely regular diagram like the one presented here.

SAMENVATTING

De Europese vertegenwoordigers van het geslacht *Ensis*, 6 of 7 in getal, al naar gelang men *E. magnus* met *E. arcuatus* wenst te verenigen of niet, leveren bij de determinatie nogal eens moeilijkheden op. Blijkbaar kan iedere soort onder omstandigheden met 2 of 3 van zijn naaste verwanten verwisseld worden, zodat men zich onwillekeurig gaat afvragen, of er in deze groep niet een bepaalde orde is te ontdekken, die de onderlinge verhoudingen wat begrijpelijker maakt.

De volgorde in het artikel over de Europese *Ensis*-soorten (Basteria Vol. 28, 1964, pp. 13-44) berust al op een zekere groepering of indeling: eerst komen de rechte, grote, aan *Solen* herinnerende soorten, aan het einde de kleine, gebogen soorten, die min of meer in de richting van *Phaxas* wijzen en daar tussen in, in het centrum bij wijze van spreken, de *Ensis magnus-arcuatus* groep, waarvan de vertegenwoordigers recht dan wel gebogen kunnen zijn.

Een poging om de onderlinge gelijkenissen te illustreren in een schema, waarin lijnen die soorten verbinden, die gemakkelijk met elkaar te verwisselen zijn, leverde het verrassende resultaat van fig. 1 op.

Het vrijwel regelmatige schema bevat de variabele *Ensis arcuatus* als centraal punt; de volgorde is, met uitzondering van de *E. arcuatus*-variëteiten, precies dezelfde als die in "The genus *Ensis* in Europe".

Het blijkt nu, dat iedere soort met zijn directe opvolger en voor-ganger in het systeem verwisseld kan worden en bovendien met een van de vertegenwoordigers van de centraal gelegen, variabele *Ensis arcuatus*-groep!

Per soort is dit in de Engelse tekst toegelicht met vermelding van de meer kritieke punten in de groep der Europese *Ensis*-soorten. De aandacht mag vooral nog even gevestigd worden op de daarin vermelde verschilpunten tussen *E. siliqua* en *E. minor*. Uit dit overzicht blijkt ook, dat de moeilijkheden zich beperken tot speciale gevallen: een bepaald gedeelte van het materiaal, jeugdstadia, e.d.

Tenslotte moet er op gewezen worden, dat de figuur niet de phylogenetische verwantschappen aangeeft, m.a.w. geen stamboom is, maar uitsluitend de onderlinge gelijkenissen tot uitdrukking brengt. In hoeverre verwantschap en onderlinge gelijkenis elkaar hier dekken, is een vraag waarop niet verder zal worden ingegaan. Op zichzelf is het al merkwaardig genoeg, dat de onderlinge gelijkenissen, resp. verwisselingsmogelijkheden bij de Europese *Ensis*-soorten zich laten illustreren in een dergelijk karakteristiek en regelmatig schema.